REMARKS

These remarks and the above amendment are responsive to the non-final Office Action issued on May 8, 2003. By this Response, claims 21, 28, 34 and 44-50 are amended, and claim 27 is cancelled without prejudice. No new matter is added. Appropriate support can be found in the application. Claims 1-20, 36, 37 and 39-43 were previously withdrawn. Claims 21-26, 28-35, 38 and 44-50 are now active for examination. A petition for a three-month extension of time also is submitted currently herewith.

The Office Action dated May 8, 2003 rejected claims 21, 22, 27, 28, 31, 34, 35, 38, 44-47, 49 and 50 under 35 USC 102(b) as being anticipated by Thiedig (DE 4041723). Claims 46 and 48 stand rejected under 35 USC 102(b) as being anticipated by Dale et al. (US Patent No. 5, 531,030). Claims 21-29, 31-33, 35 and 44 were rejected under 35 USC 103(a) as being obvious over Dale in view of Grossman et al. (US Patent No. 4,319,838). Claim 30 was objected to as being dependent upon a rejected base claim, but the Examiner indicated that claim 30 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The rejections are respectfully traversed in view of the claim amendment and remarks presented herein.

The rejections of claim 27 are now moot

By this Response, claim 27 is cancelled without prejudice. Therefore, the rejections of claim 27 are now moot.

<u>The anticipation rejection of claims 21, 22, 28, 31, 34, 35, 38, 44-47, 49 and 50 based on Thiedig is traversed</u>

Claims 21, 22, 28, 31, 34, 35, 38, 44-47, 49 and 50 were rejected as being anticipated by Thiedig. The rejection is respectfully traversed because Thiedig cannot support a prima facie case of anticipation.

By this Response, claim 21 is amended to direct to a wheel alignment method, and recites:

> A wheel alignment method...comprising the steps of:
>
> mounting a first calibration target in a first fixed predetermined relationship to the first measuring device of the machine measuring system, wherein the first measuring device is configured to generate a positional parameter of a first wheel of a vehicle;
>
> mounting a third measuring device in a second fixed predetermined relationship to the second measuring device of the machine measuring system, wherein the second measuring device is configured to generate a positional parameter of a second wheel of the vehicle...; and
>
> using a computer,
>
> repeatedly determining a relative measuring-device position value representing the position of the first measuring device relative to the second measuring device based on a position of the first calibration target relative to the third measuring device; and
>
> calculating alignment parameters of the vehicle based on the relative measuring-device position value, the first fixed predetermined relationship, the second fixed predetermined relationship, the positional parameter of the first wheel, and the positional parameter of the second wheel.

Therefore, a wheel alignment method according to claim 21 uses a first and second measuring device to obtain positional parameters for a first and second wheel of a vehicle. For example, the positional parameters may be obtained by viewing target pattern distortions of targets attached to the wheels. A calibration target is mounted to the first measuring device in a fixed predetermined relationship, and a third measuring device is attached to the second measuring device in a fixed predetermined relationship. The third measuring device measures a relative position between the third measuring device and the calibration target. A computer is used to repeatedly determining the relative position between the first measuring device and the second

measuring device. The computer then calculates the alignment parameter of the vehicle based on the positional parameters of the wheels, the fixed relationships between the measuring devices and calibration devices, and the relative position between the first measuring device and the second measuring device. Appropriate support for the amendment can be found in, for example, page 1, line 11 through page 2, line 5; page 7, line 10 through page 9, line 14; p15, lines 13-15; p16, lines 13-26; Figs. 1, 2 and 8.

In rejecting claim 21, the Office Action asserted that Thiedig teaches every limitation of claim 21. Applicants respectfully disagree.

Thiedig is related a system that uses cameras to determine whether different points of an underground drilling system are properly aligned, to ensure that a pipe being carried by the drilling system would be laid along a specified direction. As shown in Fig. 1, at least four cameras (4, 6, 7, 8) are used, of which cameras 6 and 7 are attached to each other back-to-back, viewing opposite directions. Cameras 4 and 6 are arranged to be in each other's field of view, and cameras 7 and 8 are arranged to be in each other's field of view. Camera 6 views target patterns 5 around camera 1, which has a fixed spatial relationship to camera 1. The relative position between cameras 4 and 6 can be determined based on the shape distortion of the target patterns 5. The relative position between cameras 7 and 8 can be determined in the same way. Based on the relative positions between cameras 4, 6 and 7, 8, it can be determined whether the points to which cameras 4 and 8 are attached are properly aligned.

In the Office Action, the Examiner contended that camera module 2 (including cameras 6 and 7) is comparable to the first measuring device as described in claim 12, that camera 7 is comparable to the second measuring system, that target patterns 5 are comparable to the calibration target, and that camera 6 is comparable to the third measuring device of claim 12.

Applicants respectfully submitted that the elements in Thiedig as identified by the Examiner do not meet every limitation of claim 21.

For example, claim 21 requires that the first calibration target be in a first fixed predetermined relationship to the first measuring system. However, in Thiedig, the camera module 2 (which the Examiner identified as comparable to the first measuring device) and target patterns 5 (which the Examiner identified as comparable to the calibration target) are not in a fixed predetermined relationship to each other. As discussed earlier, the cameras in Thiedig are installed on different points of a drilling system to determine whether the drilling direction deviates from a planned path based on relative positions between cameras (4, 6), (7, 8). As the drilling system moves forward, the relative positions between cameras (4, 6), (7, 8) constantly change with the movement of the drilling system. If the drilling system deviates from the planned direction, the relative positions between (4, 6), (7,8) will also change. Thus, the relative position between the cameras 4 and 6 changes constantly. Since target patterns 5 is attached to camera 4, and camera 6 is part of camera module 2, the relative position between target patterns 5 and camera module 2 also changes constantly with the moving of the drilling system. Therefore, target patterns 5 and camera module 3 of Thiedig are not in a fixed predetermined positional relationship, as required by claim 21.

Furthermore, according to claim 21, the first measuring device and second measuring device are configured to generate positional parameters of a first wheel and second wheel of a vehicle. In contrast, the cameras in Thiedig are used to determine relative positions between cameras, not vehicle wheels. In addition, the method of claim 21 uses a computer to calculate alignment parameters of the vehicle. Thiedig's system has nothing to do with wheel alignment.

Since Thiedig fails to teach every limitation of claim 21, Thiedig cannot support a prima facie case of anticipation. The anticipation rejection is untenable and should be withdrawn. Favorable reconsideration of claim 21 is respectfully requested.

Claims 22, 28, 31, 35 and 44, directly or indirectly, depend on claim 21, and incorporate every limitation thereof. Therefore, the anticipation of claims 22, 28, 31, 35 and 44 based on Thiedig is also untenable by virtue of their dependency of claim 21, as well as the additional features they recite. Favorable reconsideration of claims 22, 28, 31, 35 and 44 is respectfully requested.

Claim 34 also was rejected as being anticipated by Thiedig. By this Response, claim 34 is amended to depend from claim 21. Therefore, the anticipation rejection of claim 34 is also untenable and should be withdrawn based on the same reasons for claim 1 as well as the additional feature it recites. Favorable reconsideration of claim 34 is respectfully requested.

Claims 38 and 45-50 also were rejected as being anticipated by Thiedig. It is respectfully submitted that claims 38 and 45-50, as amended, describe features that are not available in Thiedig.

For example, similar to claim 21, claims 38 and 45-50 describe that the first measuring device and the second measuring device are configured to measure positional parameters of vehicle wheels. The methods of claims 38 and 45-50 also calculate either alignment parameters or an alignment status of the vehicle. As discussed earlier, Thiedig fails to disclose all these features. In addition, the method according to claim 50 <u>periodically</u> receives a signal representing a relative position between the first calibration device and the second calibration device. Although Thiedig discusses transmitting signals continuously to the computer, Thiedig does not teach that the signals should be sent to the computer <u>periodically</u>. Since Thiedig does not to teach every limitation of claims 38 and 45-50, Thiedig cannot support a prima facie case

of anticipation. The anticipation rejection is untenable and should be withdrawn. Favorable reconsideration of claims 38 and 45-50 is respectfully requested.

<u>The anticipation rejection of claims 46 and 48 based on Dale is overcome</u>

Claims 46 and 48 were rejected as being anticipated by Dale. The rejection is respectfully traversed because Dale cannot support a prima facie case of anticipation.

Claim 46, as amended, recites:

> A wheel alignment method...comprising the machine-implemented steps of:
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> receiving a signal generated by the first measuring device representing positional parameters of a first wheel of a vehicle;
>
> receiving a signal generated by the second measuring device representing positional parameters of a second wheel of the vehicle;
>
> repeatedly receiving a signal representing a relative position between the first calibration device and the second calibration device, wherein the relative position between the first calibration device and the second calibration device is measured by the first calibration device and the second calibration device;
>
> accessing data representing the first known positional relationship and the second known positional relationship;
>
> repeatedly calculating a relative position between the first measuring device and the second measuring device based on the signal representing the relative position between the first calibration device and the second calibration device, the first known positional relationship and the second known positional relationship; and
>
> determining alignment parameters of the vehicle based on the relative position between the first measuring device and the second measuring device, the positional parameter of the first wheel, and the positional parameter of the second measuring device.

Thus, a method of claim 48 receives signals generated by the first and second measuring devices representing positional parameters of wheels of a vehicle. In addition, for calibration purpose, the method repeatedly receives receiving a signal representing a relative position between the first calibration device and the second calibration device, wherein the relative position between the first calibration device and the second calibration device is measured by the first calibration device and the second calibration device. The method then <u>accesses data representing a first known positional relationship between the first measuring device and the first calibration device,</u>

<u>and a second known positional relationship between the second measuring device and the second calibration device</u>, and calculates alignment parameters of the vehicle based on the relative position of the first measuring device relative to the second measuring device, and the positional parameters of the first and second wheels. Appropriate support for the amendment can be found in, for example, page 1, line 11 through page 2, line 5; page 7, line 10 through page 9, line 14; p15, lines 13-15; p16, lines 13-26; Figs. 1, 2 and 8.

As already indicated in Applicants' previous response, Dale is directed to an apparatus using emitters, mirrors and sensors for monitoring calibration status of alignment sensors attached to vehicle wheels. According to Dale, right front wheel (RF) includes a ninety degree reflecting prism 48 that bends the light emitted from emitter 42 on the left front wheel (LF) ninety degrees so that it can be reflected off of mirror 40, which is in turn detected by detector 24 only when the angle between the plane of wheel RF is ninety degrees with respect to the reference line connecting heads 10 and 12.

In rejecting claim 46, the Examiner alleged that sensor head 10 (which includes emitter 42 and sensor 24) is comparable to the first measuring device, and that sensor head 12 (which includes mirror 40 and prism 48) is comparable to the second measuring device as described in claim 46. The Examiner also contended that emitter 42 and sensor 24 are comparable to the first calibration device, and mirror 40 and prism 48 are comparable to the second calibration device as required by claim 46. However, Dale's system, even based on the Examiner's construction, does not disclose every limitation of claims 46.

As discussed earlier, the method accordingly to claim 46 requires <u>accessing data representing the first known positional relationship (between the first measuring device and the first calibration device) and the second known positional relationship (between the second measuring device and the second calibration device)</u>; repeatedly <u>calculating</u> a relative position

between the first measuring device and the second measuring device based on the signal representing the relative position between the first calibration device and the second calibration device, the first known positional relationship and the second known positional relationship; determining alignment parameters of the vehicle based on the relative position between the first measuring device and the second measuring device, the positional parameter of the first wheel, and the positional parameter of the second measuring device." (emphases added)

Dale's system does not have these features. The emitter 42 and sensor 24, and mirror 40 and prism 48 in Dale's system are installed on the first sensor head 10 and second sensor head 12, respectively. Dale's system does not store data related to the positional relationship between the first sensor head 10 and emitter 42 and sensor 24, and the positional relationship between the second sensor head 12 and mirror 40 and prism 48. Thus, Dale's system does not *access* data representing the first known positional relationship (between the first measuring device and the first calibration device) and the second known positional relationship (between the second measuring device and the second calibration device), as required by claim 46.

In addition, since Dale's system does not access data representing the first known positional relationship and the second known positional relationship, Dale's system does not calculate a relative position between the first measuring device and the second measuring device based on the first known positional relationship and the second known positional relationship, as required by claim 46.

Furthermore, although Dale's system may generate toe readings for the wheels, the toe readings are obtained directly from the output of toe sensors. Dale's system does not determine alignment parameters of the vehicle based on the relative position between the first measuring device (sensor 10) and the second measuring device (sensor 12), the positional parameter of the

first wheel, and the positional parameter of the second measuring device, as required by claim 46.

Moreover, it is respectfully pointed out that, in rendering the rejection, the Office Action appears to cite erroneous sections to support the Examiner's arguments. In rejecting claim 46, the Examiner repeatedly cited sections from col. 3, line 45 through col. 4, line 33 (see pages 10 and 11 of the Office Action). These cited sections, however, are related to operations of sensor head 14, and have nothing to do with the components identified by the Examiner in sensor head 12.

Since Dale fails to teach every limitation of claim 46, Dale cannot support a prima facie case of anticipation. Therefore, the anticipation rejection of claim 46 based on Dale is overcome. Favorable reconsideration of claim 46 is respectfully requested.

Claim 48 depends on claim 46 and incorporates every limitation thereof. Accordingly, the anticipation rejection of claim 48 based on Dale is also overcome by virtue of its dependency of claim 46 as well as the additional features it recites. Favorable reconsideration of claim 48 is respectfully requested.

<u>**The obviousness rejection of claims 21-29, 31-33, 35 and 44 is traversed**</u>

Claims 21-29, 31-33, 35 and 44 were rejected as being obvious over Dale in view of Grossman. The obviousness rejection is respectfully traversed because Dale and Grossman cannot support a prima facie case of obviousness.

By this Response, claim 21 is amended. Claim 21, after the amendment, recites "mounting a first calibration target in a first fixed predetermined relationship to the first measuring device of the machine measuring system, wherein the first measuring device is configured to generate a positional parameter of a first wheel of a vehicle; mounting a third measuring device in a second fixed predetermined relationship to the second measuring device of

the machine measuring system, wherein the second measuring device is configured to generate a positional parameter of a second wheel of the vehicle...; using a computer, repeatedly determining a relative measuring-device position value representing the position of the first measuring device relative to the second measuring device based on a position of the first calibration target relative to the third measuring device; and calculating alignment parameters of the vehicle based on the relative measuring-device position value, the first fixed predetermined relationship, and the second fixed predetermined relationship, the positional parameter of the first wheel, and the positional parameter of the second wheel."

Dale, as discussed earlier relative to claim 46, does not calculate alignment parameters based on predetermined positional relationships between measuring devices and calibration devices. Furthermore, as discussed in the previous response, Dale merely uses the light source 42 and mirror 40 as a reference signal to compare with readings of detector 32. Dale does not determine a relative measuring-device position value representing the position of the first measuring device relative to the second measuring device based on a position of the first calibration target relative to the third measuring device. Therefore, Dale fails to disclose "repeatedly determining a relative measuring-device position value representing the position of the first measuring device relative to the second measuring device based on a position of the first calibration target relative to the third measuring device; and calculating alignment parameters of the vehicle based on the relative measuring-device position value, the first fixed predetermined relationship, and the second fixed predetermined relationship, the positional parameter of the first wheel, and the positional parameter of the second wheel," as required by claim 21.

Grossman, the other reference cited by the Examiner, does not alleviate these deficiencies. In the Office Action, the Examiner simply alleged in blanket that Grossman, at the tope of col. 9, "TRT', total rear toe, teaches the limitation in claim 21 relating using a computer

to calculate relative positions. However, Grossman, in the sections related to total rear toe, merely discusses that the total rear toe can be derived from various readings from detectors disposed at different positions, including left rear toe and right rear toe. Grossman does not discuss calculating alignment parameters based on predetermined positional relationships between measuring devices and calibration devices. The calculation of total rear toe (TRT) in Grossman does not involve the predetermined positional relationships between measuring devices and calibration devices at all. Therefore, similar to Dale, Grossman also fails to teach "repeatedly determining a relative measuring-device position value representing the position of the first measuring device relative to the second measuring device based on a position of the first calibration target relative to the third measuring device; and calculating alignment parameters of the vehicle based on the relative measuring-device position value, the first fixed predetermined relationship, and the second fixed predetermined relationship, the positional parameter of the first wheel, and the positional parameter of the second wheel," as required by claim 21.

Consequently, Dale and Grossman, even combined, do not teach every limitation of claim 21. Therefore, Dale and Grossman cannot support a prima facie case of obviousness. The obviousness rejection is untenable and should be withdrawn. Favorable reconsideration of claim 21 is respectfully requested.

Claims 21-26, 28, 29, 31-33, 35 and 44 depend on claim 21 and incorporate every limitation thereof. Accordingly, the obviousness rejection of claims 21-26, 28, 29, 31-33, 35 and 44 based on Dale and Grossman is also overcome by virtue of their dependency as well as the additional features they recite. Favorable reconsideration of claims 21-26, 28, 29, 31-33, 35 and 44 is respectfully requested.

The objection of claim 30 is addressed

Claim 30 was objected as being dependent upon a rejected base claim, but the Examiner indicated that claim 30 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 30 depends on claim 21 and incorporates every limitation thereof. As discussed above, claim 21 is patentable over the references of record. Therefore, claim 48 is also patentable over the references of record based on its dependency of claim 21 and the additional features it recites. Favorable reconsideration of claim 30 is respectfully requested.

Conclusion

For the reasons given above, Applicants believe that this application is conditioned for allowance and Applicants request that the Examiner give the application favorable consideration and permit it to issue as a patent. However, if the Examiner believes that the application can be put in even better condition for allowance, the examiner is invited to contact Applicants' representatives listed below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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